



National Weather Service
Quad Cities
School Guide



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Introduction

On April 8, 1999 at 5 p.m. the skies were partly sunny and the temperature was in the 70s in Hamilton, Illinois. Several sporting events were scheduled for that evening in the Hamilton School District, including a baseball game and a track meet. At 6:52 p.m. an F3 tornado struck Hamilton, including the baseball field and track where the events had been planned. No one was hurt. No one was even there. Why? Because a school official was aware that there was a risk of severe weather that day. He called the National Weather Service that afternoon, and based on a real-time assessment of the potential for severe weather, made the tough decision to cancel the events, in spite of the current tranquil conditions. He undoubtedly saved lives.

We are the National Weather Service, Quad Cities Forecast Office, serving eastern Iowa, western Illinois, and northeast Missouri. Our mission is to protect lives and property from the effects of extreme weather, including everything from fog to lightning, tornadoes to blizzards, wind chill to heat waves. We provide information to help officials and local school decision-makers anticipate the effects all types of weather on staff, students, and activities. We want to help you plan and prepare for the variety of weather conditions that we face here in the Midwest.

This guide is designed to outline for you the support available to all schools by our office. For further information about our office, products, or services, contact Donna Dubberke at (563) 386-3976, ext. 726 or donna.dubberke@noaa.gov

Background & Mission

“The National Weather Service provides weather, hydrologic, and climate forecasts and warnings ... for the protection of life and property and the enhancement of the national economy.”

This mission is carried out by a highly trained workforce amidst a network of weather offices located throughout the United States and its territories. Through this network, the National Weather Service provides data to several user communities around the clock. Information is made available to the private sector through such outlets as the NOAA All Hazards Wire Service and the Emergency Managers Weather Information Network to meet specific and unique individual, corporate, and educational needs.

The National Weather Service offers:

- Warnings and Forecasts for Severe Weather
- Warnings and Forecasts for Winter Weather
- Warnings and Forecasts for Tropical Weather
- Warnings and Forecasts for Non-Precipitation Hazards
- Warnings and Forecasts for the Aviation, Hydrologic, Marine, and Fire Weather Communities
- Digital and Text Forecasts for Various Weather Parameters through 7 Days
- Forecasts for General Weather Trends beyond 7 Days
- Spot Weather Forecasts for Emergency Management and Land Management Agencies in support of HAZMAT and Wild Fire Containment
- High-Quality Data Collection and Distribution to the Private Sector
- Historical Databases of Climate Phenomena
- Preparedness information for all seasons

Within the framework outlined above, our priority for service to the nation is ***protection of life and property, and enhancement of the national economy***. For the National Weather Service in the Quad Cities, this means constantly striving to provide accurate weather and hydrologic services to the best of our ability for the residents in Eastern Iowa, Northwest Illinois and Northeast Missouri.

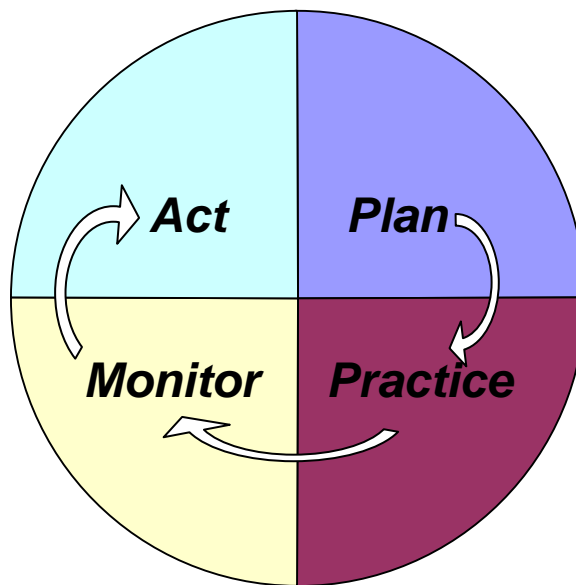
Hazardous Weather

It was July 13, 2004 at about 4:30 pm in the afternoon. A tornado packing winds over 200 mph tracked near Roanoke, Illinois, striking Parsons Manufacturing. Cars and semi trucks were tossed. I-beams were twisted. The factory was demolished. There were 140 people in the building at the time. No fatalities. No injuries. Not even a scratch.

What was the secret to this amazing success story? It can be boiled down to Bob Parsons, the owner of the company, and his commitment to protecting his employees from the very real danger of severe weather in the Midwest. Mr. Parsons instituted an extraordinarily effective severe weather strategy that went far beyond putting a plan on paper.

It started with his severe weather plan – including construction of 3 tornado shelters in the facility. They practiced. In fact, they had had a tornado drill at the factory one week before the tornado struck. They monitored the weather using a designated weather watcher – the security staff who monitored their weather radio and the sky. And when the time came to act, it only took 3 minutes to get everyone to safety.

Each piece of the puzzle is critical. If you take any single piece out, you don't have the whole picture; you don't have the same outcome.



Plan:

An Effective Hazardous Weather Plan

- Plan**
 - Know the threats
 - Address each threat as it applies to your faculty, staff, and students (Flash Flood, Hail, Blizzard, Extreme Heat/Cold, Tornado, Extreme wind, Lightning)
 - Consider time of day
 - peak tornado occurrence is 4-7 pm
 - peak high wind occurrence is 6-9 pm

- Practice**
 - Training meetings: Make sure everyone knows the plan
 - Drills: Practice the plan
 - Evaluate time needed
 - Evaluate suitability of shelters
 - Severe Weather Awareness Week – tornado drill day for each state

- Monitor**
 - Designated Weather Watcher
 - Available information: before, during, after
 - Outlook: what to expect that day
 - Watch: within a few hours
 - Warning: severe thunderstorm, tornado
 - Your eyes: the spotter network

- Act**
 - Be proactive
 - Establish criteria
 - Based on watches, warnings, reports, other?
 - Consider how much time you need for people to reach shelter
 - How will action be initiated?
 - Means of communication
 - Backup plan
 - Where will people go?
 - Recommended saferooms
 - Lowest Floor
 - Interior of Building
 - Small roof spans
 - Without windows
 - Enough space
 - Enough time to get there
 - How will you communicate an “all-clear”?

Plan:

Identifying Safe Areas in Your Facility

The greatest dangers from tornados and high wind are roof failure, breaking glass, and flying debris. **The most dangerous locations in schools are generally large rooms with big expansive roofs such as cafeterias, gyms, and auditoriums.** In these cases, loss of a load-bearing wall may lead to failure of the entire roof. Rooms with large windows that may shatter when struck by airborne missiles or pressure stresses are also extremely dangerous. Once strong wind enters a building, a domino effect of damage can occur. Closure of internal fire doors may be a method to limit this problem. Do not open windows. This may actually result in greater damage and wastes valuable time that should be used moving to a safe location.

The best protection is offered by small interior rooms, bathrooms, and windowless, interior hallways that are away from exterior doors. Interior load-bearing walls with short roof spans provide better protection than temporary or non-load bearing walls or structures. In multi-level schools, always evacuate the upper level and move to the lowest available levels (including basement, if possible). When time permits, evacuate temporary buildings.

Some schools designed in the open-classroom concept may have a less than desirable amount of safe space due to a lack of interior load-bearing walls, large spanning roofs, and large windows. You may not be able to find enough "ideal" space for all students. In this case, you will need to prioritize the space available. Start with (1) interior, lower level non-load bearing walls; then (2) interior walls of upper levels, exterior walls of lower levels, and interior glass; (3) exterior walls of upper levels; (4) rooms with large roof spans, mobile, or temporary classrooms; and (5) windows in exterior walls.

Fortunately, the majority of tornadoes and downbursts will not destroy well constructed buildings, and damage in about 70% of cases would be confined to rooms with large roof spans. You may wish to use the ranking above and prioritize your safe areas, filling students in those locations first. When developing your local plan, it is best to have an engineer advise your school on the safest areas since they understand the design of your particular facility. The list above is based on broad generalities.

For details on engineered tornado shelters, visit FEMA's web site at www.fema.gov/mit/saferoom

Special Considerations

One complication to activating a full "Call to Action" plan is if it occurs during class changes when the halls are crowded and students may not know where to go. It may be best to hold classes beyond regular dismissal time until the severe weather threat has passed. Likewise, at the end of the school day, students may need to be held from boarding busses until the danger has passed.

Special Considerations for Winter Weather

Teachers and bus drivers should be taught to recognize symptoms of frost bite and hypothermia. Delaying school hours may or may not solve the problem of students standing at bus stops in the cold. Bus stop shelters would help protect the students from the exposure to wind.

Special Considerations for Heat

Humidity adds to the effects of heat. In any kind of hot weather, heat disorders such as cramps, heat exhaustion, and heatstroke are possible. Students should be kept out of the sun and strenuous activities should be eliminated. Encourage students to drink lots of water and wear light-colored, light-weight clothing. Teachers, coaches, and bus drivers should know the symptoms of heat disorders.

Practice:

Severe Weather Awareness Week

Practice makes perfect. Practicing your severe weather emergency plan through periodic severe weather drills and severe weather safety training is critical to success. Drills not only teach students and instructors the actions they need to take, but will allow you to evaluate your plan's effectiveness.

Two drills per year are recommended: one in the fall as an introduction for new students and teachers, and the second in the early spring. You may wish to conduct the spring drill in conjunction with Severe Weather Awareness Week. Each state designates a week each year as Severe Weather Awareness week. Within that week, a date and time is set for a tornado drill. At that time, a test tornado warning will be issued and disseminated. This allows you the opportunity to test your communications and strategy, beginning to end.

Illinois usually designates the first week of March as Severe Weather Awareness Week. Iowa typically designates the last week of March, and Missouri designates a week in the middle of March.

Tornado drill dates and times can be found at:

Nationwide:

<http://weather.gov/om/severeweather/severewxcal.shtml>

Iowa:

www.iowahomelandsecurity.org

Illinois:

www.state.il.us/iema

Missouri:

<http://sema.dps.mo.gov>

Monitor:

Designated Weather Watcher

The designated weather watcher is key to the success of any severe weather plan. ***The designated weather watcher monitors weather information, allowing everyone else to focus on the activities at hand.*** During school functions such as sporting events, graduations, etc, it is especially important to designate a weather watcher to keep tabs on changing conditions and alert the decision makers to any impending hazard.

- **Know what is expected:** Typically someone would start the day by reviewing the Hazardous Weather Outlook for an overview of any anticipated hazards that day. The HWO is available on the web site and on NOAA All Hazards Radio. For more about the Outlook, see the descriptions of our products on pages 10 and 11 of this guide.
- **Hazardous weather monitoring:** All advisories, watches, and warnings are available both on our homepage and NOAA All Hazards Radio. Also available is the Short Term Forecast. The Short Term Forecast can be particularly helpful in monitoring non-severe weather, including thunderstorms and lightning.

The fastest, most accurate and reliable means of receiving critical weather information at your school is through a NOAA All Hazards Radio with a "tone alert" feature. Warnings are broadcast within seconds of being issued by the National Weather Service.

Consider a handheld NOAA Radio for outdoor activities.

Your radio or television should be located in the main office or near the person(s) responsible for enacting the plan. Main offices are good because generally there is always a number of people around who could hear the alert, and in a quick emergency, it is close to the public address (PA) system. NOAA Radios should be set at all times in "Alert" mode.

It is also handy to keep a detailed map nearby for quick reference to locate storms and their movement in relation to your school. When a warning is issued for a nearby area, you may or may not need to take action, depending on the storm's path and speed of movement. When a warning is issued that includes your community, quick action may be needed.

If your school is not in a reliable NOAA Radio listening area, try attaching your radio to an exterior antenna. If that does not help, here are a few alternatives -

- If you have cable television access, The Weather Channel uses NWS products and broadcasts warnings immediately upon receipt from NWS via a satellite link. Warnings are continuously scrolled across the bottom of the screen.
- Some cable companies include a channel with a local NWS radar display and use NOAA All Hazards Radio as a voice-over.
- Monitor your local news radio station for EAS messages and special statements from the National Weather Service. EAS operates on a cooperative agreement between broadcasters and federal, state, and local government agencies. EAS is activated for tornado warnings and severe flash flooding.

Phone "call-down" systems are not advised for receipt of warning information due to time elapsed in relaying information, chance of incorrect or incomplete information being passed, lack of reliability of phone systems during storms, and the NWS advises people not to use telephones during an electrical storm.

Monitor

Text Services from the NWS

The National Weather Service provides a number of text services which can assist you in decision-making for weather-sensitive activities. All of these products are available 24-7 on our web page and via NOAA All Hazards Radio. A list and brief description of the most common products follows.

Hazardous Weather Outlook - A narrative outlook which discusses the potential for significant weather primarily during the next twenty-four hours. The timing, location, amount and duration of snow, blowing snow, ice, rain, wind, severe weather, flooding/flash flooding, extreme heat/humidity, and freezes/frosts are discussed. This product is designed for high-end decision makers such as emergency managers, police/fire departments, school districts, transportation departments, severe weather spotters, etc.

The Hazardous Weather Outlook is issued each morning by 5 am, and updated at other times as needed. It is broadcast on NOAA All Hazards Radio and is available on our webpage.

Watches (both Winter and Summer) - Watches are issued to indicate that hazardous weather is possible.

- Severe Thunderstorm Watch - indicates severe weather (large hail $\frac{3}{4}$ inch and/or damaging straight-line winds ≥ 58 mph) is possible in and close to the Watch area. These Watches are generally issued for areas the size of a state or parts of a few states, and are valid for a four- to six-hour period.
- Tornado Watch - indicates tornadoes are possible in and close to the Watch area. These Watches are generally issued for areas and durations similar to severe thunderstorm watches.
- Flash Flood Watch - indicates flash flooding is possible in and close to the Watch area. Watches are generally issued for areas less than the size of a state and can be valid for up to about 12 hours.
- Winter Storm Watch - issued 12 to 36 hours in advance of winter weather conditions (blizzards, snow, blowing snow, ice, wind chills, or combinations thereof) that may become hazardous or life threatening.

Warnings - Issued when life-threatening conditions exist or are imminent.

- Severe Thunderstorm Warning - issued when a severe thunderstorm is indicated by radar or reported by public safety officials, spotters, or the general public. Implies hail $\frac{3}{4}$ inch diameter and/or straight-line winds ≥ 58 mph. Usually issued for one or parts of a few counties up to one hour in duration.
- Tornado Warning - issued when a tornado, or thunderstorm likely to cause a tornado, is indicated by radar or reported by public safety officials, spotters, or the general public. Usually issued for one or parts of a few counties up to one hour in duration.
- Flash Flood Warning - issued when heavy rains are or will shortly result in life-threatening circumstances due to overflowing streams or creeks, mud slides, water over roadways, etc. Usually issued for one or a few counties for up to a six-hour duration.
- Heat Warning - issued with a Heat Index (HI) ≥ 115 F and a minimum overnight HI of 80 F.
- High Wind Warning - sustained winds 40 mph for 1 hour or more or gusts ≥ 58 mph.
- Blizzard Warning - sustained wind or frequent gusts ≥ 35 mph, considerable blowing and drifting of snow, and a visibility of $\frac{1}{4}$ mile or less.
- Winter Storm Warning - 6 inches of new snow in 12 hours or 8 inches in 24 hours when wind will cause blowing and drifting problems, or for ice accumulations $\geq \frac{1}{4}$ inch.

Advisories - Issued when conditions are hazardous but not life threatening if reasonable caution is used.

- Urban and Small Stream Flood Advisory - heavy rains resulting in nuisance conditions such as minor overflowing of streams or creeks, or ponding of water over roadways, drainage areas, etc. Usually issued for one or a few counties for up to a six-hour duration.
- Dense fog advisory – widespread visibility $\frac{1}{4}$ mile or less, creating a significant hazard
- Heat Advisory - Heat Index 105°F
- Wind Advisory - sustained winds 30 mph for 1 hour or more or gusts 45 mph.
- Winter Weather Advisory - issued for hazardous (but not generally life-threatening) conditions of
 - snow - generally 3-5 inches
 - blowing snow - visibility $\frac{1}{4}$ mile due to blowing
 - wind chill - values -30 to -35°F
 - freezing rain/drizzle - thin ice glaze $<\frac{1}{4}$ inch

Forecasts and Observations –

- Short-term Forecast - our primary method for communicating forecasts of short-term (one to six hours in advance) weather and hydrologic conditions to the general public.
- Zone Forecast - routine forecasts issued for each county twice daily and updated as required which contain the basic forecast elements (maximum and minimum temperatures, precipitation type and probability, wind, clouds, etc.) For the next 1 to 7 days.
- Hourly Observations - a collection of weather observations made shortly after the top of the hour which contain temperature, current weather, wind, dew point, air pressure and seasonally, the wind chill or heat index.

Monitor

NOAA All Hazards Radio

NOAA All Hazards Radio provides a continuous broadcast of weather information, forecasts, and warnings direct from the local National Weather Service office. Broadcasts air twenty-four hours a day. Special radios necessary to receive the broadcast are available at many stores which sell electronic equipment. Many local communities have received grants or have teamed up with civic-minded companies to place NOAA All Hazards Radios in all local schools. If you do not already have a Weather Radio at your school, you can contact your county Emergency Management Agency to see if a similar program exists in your community.

NOAA All Hazards Radio is a service of NOAA's National Weather Service. As the voice of the National Weather Service, it provides continuous broadcasts of the latest weather information. Digitally recorded weather messages are repeated every three to five minutes and are routinely revised at least every hour to cover changing weather conditions. NOAA All Hazards Radio serves the three state region and operates on a 24/7 basis, with the format tailored to the needs of the people within the listening area. During severe weather, the National Weather Service preempts the routine weather broadcast and substitutes special warning messages.

NOAA All Hazards Radio broadcasts warnings and post-event information for all types of hazards - not just weather! As conditions warrant, broadcast information includes: natural (such as earthquakes, forest fires, and volcanic activity), human/technological (such as chemical releases, oil spills, nuclear power plant emergencies, AMBER alerts, etc.), and national emergencies. Working with other Federal agencies and the Federal Communications Commission's (FCC) Emergency Alert System (EAS), NOAA All Hazards Radio truly is an all-hazards radio network, making it the single source for the most comprehensive weather and emergency information available to the public.

Currently, 13 NOAA All Hazards Radio transmitters serve the area covered by WFO Quad Cities. (See Appendix C for a complete listing.) The broadcasts can be heard as far away as 40 miles from the antenna site, sometimes more. The effective range depends on many factors, particularly the transmitter height, terrain, receiver quality, and present weather. An outside antenna can significantly improve reception.

For schools, we recommend:

- A radio with the tone alert feature and SAME capability. This type of radio will sound an alarm when a warning is issued for your specific county. (You control the programming of these radios.)
- A battery backup in case of a power failure.
- Some more expensive NWR models can be tied into your PA system, can set off a pager or telephone someone, have flashing lights for new warnings, or a button to play the warning back with a date/time stamp.
- Consider a portable radio for your security, principle, coaches, or athletic director.

Remember to:

1. Replace the back-up battery yearly to make sure it will work in the case of a power failure.
2. Place the radio in a central location where the decision-makers in your school have easy access and can hear the alarm whenever people might be in the building.
3. Make sure the radio is in stand-by mode, ready to alarm when a warning is issued.
4. Monitor at least one weekly tone-alert test to make sure your radio is working properly and

receiving the tone alert signal. (Tests are conducted every Wednesday between 11 am and noon.)

NOAA All Hazards Radio is the smoke detector of severe weather. Our warnings delivered directly to you immediately when they are issued, so you can take the actions you deem necessary.

References:

Appendix C: Coverage Map and local station listing

Appendix D: FIPS codes for programming radios

National NOAA Weather Radio Page: www.weather.gov/nwr

Local NOAA Weather Radio Page: www.crh.noaa.gov/dvn/wxradio

Monitor:

Information Superhighway - www.crh.noaa.gov/dvn

Whether you need tomorrow's forecast or last month's climate data, WFO Quad Cities Internet page features a wealth of information that is sure to fulfill many of your weather-related needs. To provide a quick assessment of current weather at a glance, links to local forecast and hazardous weather information, radar images, and weather headlines are front-and-center. Also accessible are details on NOAA All Hazards Radio, information and photographs from historic weather events, our online newsletter, and links to a variety of computer model weather data. To support your preparedness and safety needs, a plethora of downloads are also available on our website. These downloads include: brochures, reference materials, weather presentations, and other weather support resources.

National Weather Service Forecast Office
Quad Cities

Home Site Map News Organization

Local forecast by "City, St" or Zip Code
City, St Go

Current Hazards
Current Hazards Outlook
Send Storm Report

Current Conditions
Observations
Satellite Images
Road Conditions

Radar Imagery
Local Area
Nationwide

Forecasts
Local Area
Graphical
Interactive
Aviation
Fire Weather
Air Quality

Rivers & Lakes
River&Lakes AHPS

Climate
Local Data
Prediction
Past Events

Weather Safety
Storm Ready
Preparedness
Weather Radio

Miscellaneous
Coop. Observers
Science & Ed.
Downloads
About our Office

Contact Us
Webmaster

Top News of the Day

- Moline, IL and Dubuque, IA summer climate in review. These products and more are available on our local data [climate page](#).
- Summary of Storm Damage from the Cedar Rapids area (8/26)
- Hurricane Information
- Wanted: Volunteer Observers in Columbus Junction, Maquoketa, and Fairbank, Iowa
[Details inside...](#)
[more headlines...](#)

Quick glimpse at the weather Quad Cities area

Click on the map below for the latest forecast.

Read watches, warnings & advisories

Flood Statement
Short Term Forecast
Hazardous Weather Outlook

Zoom Out

Map showing Quad Cities area with various weather conditions. Last map update: Wed, Sep 15th 2004 at 11:08:12 pm CDT.

... AREA WEATHER ROUNDUP ...

Click the scrolling text for an expanded view.

If your browser does not support Java click [here](#) for the Area Weather Roundup

Of particular interest is the array of current weather information-right at your fingertips! This includes:

- **Hazardous weather and hydrologic information** (outlooks, warnings, storm reports)
- **Radar and satellite images**
- **Forecast Information** (public, hydrologic, aviation, and fire weather)
- **Current observations** (both general weather and hydrologic)
- **Climate data** (daily, monthly, and record information)

Act:

School Severe Weather Safety

Reminder: Always take into account the time it will take to move people to the safest places.

Alerting Staff, Teachers, and Students to a Weather Emergency

Most schools utilize a public address (PA) system to talk directly to students and teachers. In some cases, electricity may be lost during a storm before you have activated your plan. Therefore, it is critical to have a back-up alerting device such as a compressed air horn or megaphone. You may need to make special arrangements for

- Outdoor activities
- Mobile classrooms or detached gymnasiums that are not part of a PA or intercom system (Sending "runners" to mobile classrooms is not advised due to the danger posed by lightning and the approaching storm.) Wireless communication devices are an effective means for such communication, such as "Family Radios".
- Handicapped or learning-disabled students, who may require assistance in taking action.

Outdoors: Outdoor activities will be the most susceptible to weather hazards with lightning being the greatest threat. Officials involved in all outdoor activities, such as sporting practices and events should be aware of the risks of lightning and severe weather. If thunder is heard or lightning is seen, outdoor activities should be delayed with students and spectators moved to safety immediately. Do not wait for the rain. The delay in activities should last until thunder has not been heard and lightning not seen for 30 minutes.

Indoors: Use as much information as possible about the type of storms, expected impact and time of impact on your school district to assess the risk. A plan may work best with phases of activation. For instance, outdoor activities are usually the most susceptible to weather hazards and may be delayed or cancelled first. As the storms approach, you may want to move students from the most susceptible areas of your school, such as mobile classrooms and gymnasiums, to safer areas as a precaution, even though a warning has yet to be issued. (You might also do this for "High Wind Warnings"). For potentially severe thunderstorms, you may want to post teachers or school personnel trained in spotting severe weather in key positions to watch the storms as they approach. When large hail is the main threat, move students out of rooms with skylights.



The Tornado Safety Position: For extremely high winds or tornados, assume the tornado safety position. Sit, facing an interior wall. Bend over and cover your head and neck with your hands.

Determining When to Hold Departure of School Buses

Buses provide no protection from severe storms. You will want to consider holding the departure of students to buses whenever watches or warnings are in effect, taking into account (1) the time it will take before all students reach their homes (including time for the students to walk from their bus stop to their home) and (2) when the storms are expected to impact your district. You might also consider if a large number of your children live in mobile homes. The school would provide a far safer environment.

After the Event

Once the storm has past, stay alert for the possibility of additional storms. If your school sustains damage, shut off the gas and electricity for safety purposes. Do not attempt to evacuate students through damaged areas, as downed power lines and debris pose a grave danger.

Act:

School Bus Weather Safety

All school bus drivers should be trained to handle severe weather situations. The primary concerns are flooding and tornadoes, but high wind, heavy snow or ice, extreme heat or cold, and wind chill also pose a threat.

Tornadoes:

- Bus dispatcher should have a NOAA All Hazards Radio with tone alert.
- Don't drive during a "Tornado Warning".
- We recommend that all bus drivers attend Skywarn Spotter training if possible.
- If time permits, drive at a right angle to the funnel path. **You cannot outrun a tornado.**
- Get to a well-constructed building whenever possible.
- If shelter is not available, evacuate students through both exits at the nearest ditch or depression on the downwind side of the road.
- Students should lie flat in a low place facing the funnel cloud and covering their heads.
- Move the bus away from the students, radio the base station, and remove the first aid kit.

Flooding:

NEVER ATTEMPT TO DRIVE THROUGH FLOOD WATERS! If your bus route takes you across small streams and creeks or along a river, you should determine an alternate route to travel or have a contingency plan to return to the school once flood waters are encountered. Major river flooding generally is well forecast with warnings issued early enough that schools and drivers can plan their strategy before placing the students on the bus. In general, shallow ponding of water on the roadway is usually not a problem. Sudden (flash) flooding poses the greatest threat.

- If the water is too deep to see the road, DO NOT CROSS. The road may have been undermined or the water may be deep enough to stall the bus and place all of its occupants in danger.
- Do not enter underpasses that are filling with water.
- If the water appears to be flowing, do not enter. The bus will act as a barrier and the water will attempt to lift and move the bus.
- If water is flooding over or around a bridge, do not cross it, it might collapse from the weight of the bus. The foundation of the bridge may have been compromised.
- If caught in flood waters, abandon the bus and seek higher ground immediately.

Exposure to Heat and Cold:

Children awaiting the school bus in the morning, standing exposed to a cold wind without proper clothing for protection, may develop hypothermia. School bus drivers and teachers should be taught to recognize symptoms of hypothermia, frost bite, and exhaustion, and heat stress.

Education Related Services

Weather and Science Resources for Educators

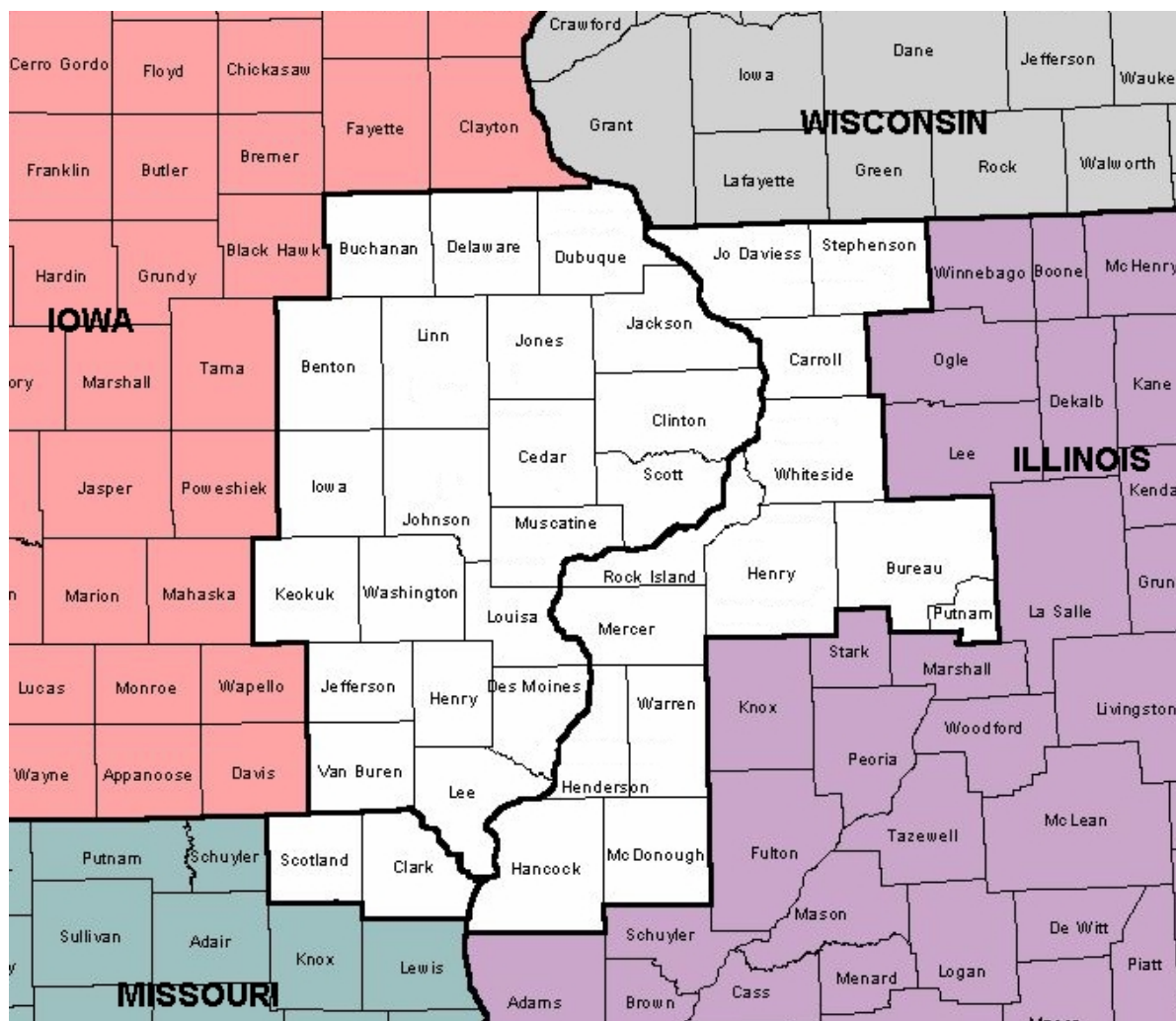
- Quad Cities NWS Office Education Page: www.crh.noaa.gov/dvn/ScienceandEducation
- NWS Online Weather School: Jetstream: www.srh.noaa.gov/srh/jetstream
- NOAA Weather and ocean Education: www.education.noaa.gov
- NWS Education/Outreach Page: www.weather.gov/education.php
- University Corporation for Atmospheric Research: www.ucar.edu/ucar/edout.html

Appendix A: Service Area Configuration

There are numerous National Weather Service Weather Forecast Offices (WFO) located throughout the United States. Each WFO is responsible for maintaining a database of digital forecast grids within its forecast area for a running 7-day period. The always-current forecast grids become a part of the larger National Digital Forecast Database, which is accessible to everyone. Each office also issues public, aviation, hydrologic, and short-term forecasts. Finally, the WFO disseminates a variety of hazardous weather warnings and statements for all counties within its warning area.

WFO Quad Cities' area of responsibility encompasses 36 counties, comprised of 21 in Iowa, 13 in Illinois, and 2 in Missouri. Immediately surrounding WFO Quad Cities are other offices located in: La Crosse and Madison, Wisconsin; Chicago and Lincoln, Illinois; St. Louis and Kansas City in Missouri; and Des Moines, Iowa.

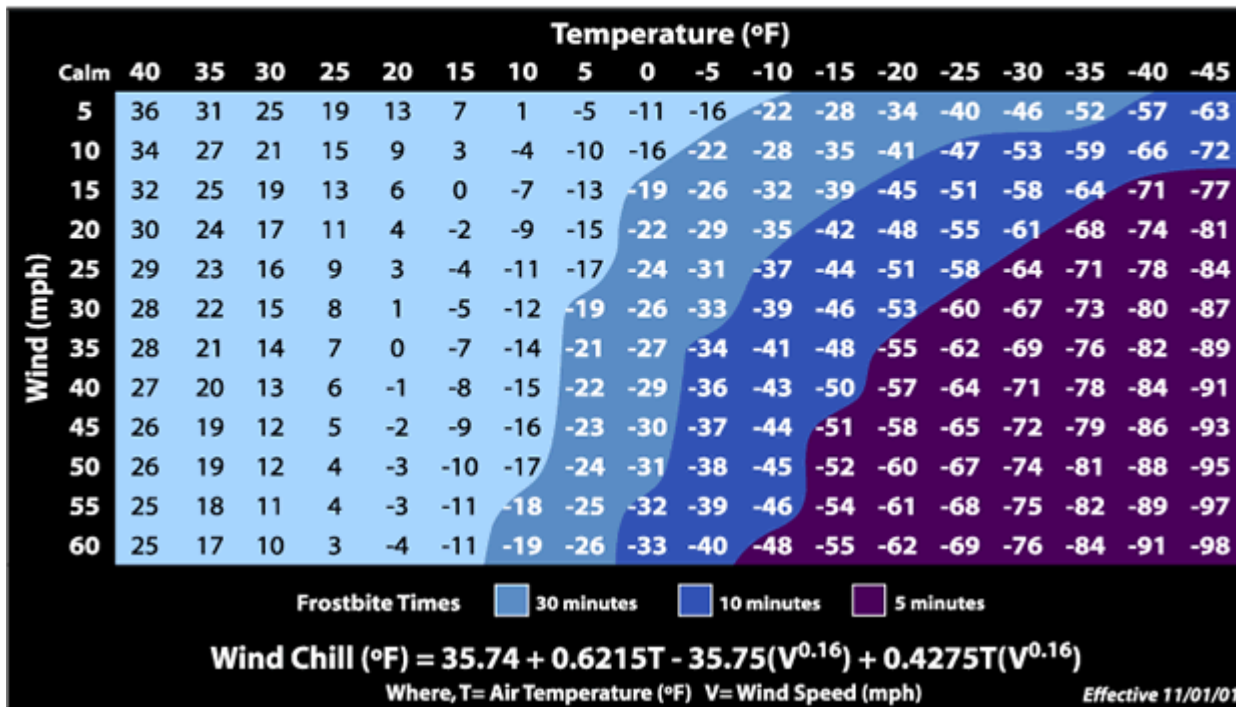
The following map details the county configuration for the Quad Cities Service Area. WFO Quad Cities' area of responsibility encompasses the counties in white:



Appendix B: Wind Chill and Heat Index Charts



Wind Chill Chart



Heat Index (Apparent Temperature) Chart

The **Heat Index** (HI) is the temperature the body feels when heat and humidity are combined. The chart below shows the HI that corresponds to the actual air temperature and relative humidity. NOTE: This chart is based upon shady, light wind conditions. **Exposure to direct sunlight can increase the HI by up to 15°F**

Heat Index

General Effect of Heat Index on People in Higher Risk Groups

80 to 89° - Caution	Fatigue possible with prolonged exposure and/or physical activity.
90 to 104° - Extreme Caution	Sunstroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity.
105 to 129° - Danger	Sunstroke, heat cramps or heat exhaustion likely, and heatstroke possible with prolonged exposure and/or physical activity.
130° or higher - Extreme Dangers	Heat/sunstroke highly likely with continued exposure.

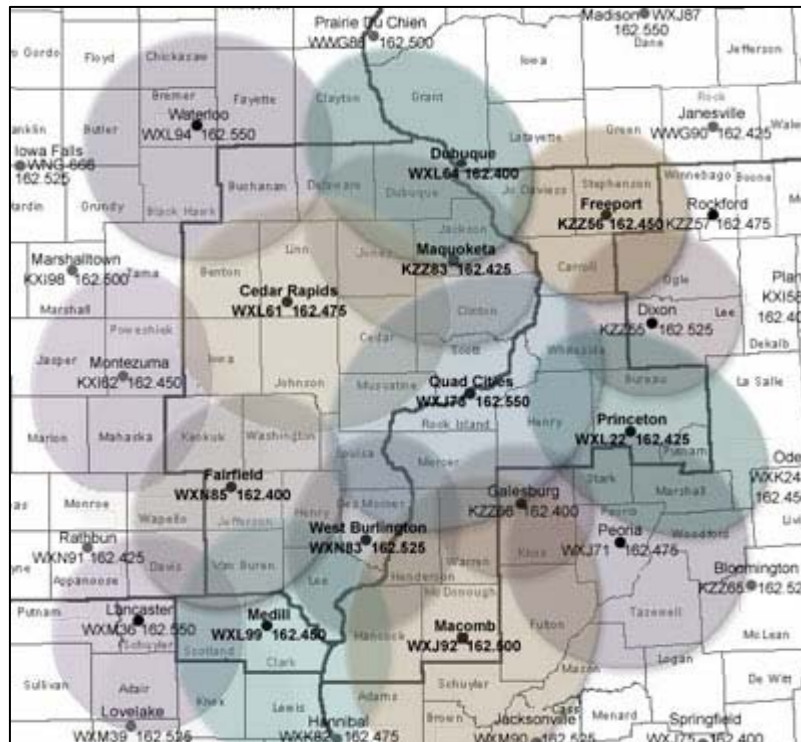
Relative Humidity (in percent)

		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Air Temp (in F)	120	107	111	116	123	130	139	148														
	115	103	107	111	115	120	127	135	143	151												
	110	99	102	105	108	112	117	123	130	137	143	150										
	105	95	97	100	102	105	109	113	118	123	129	135	142	149								
	100	91	93	95	97	99	101	104	107	110	115	120	126	132	138	144						
	95	87	88	90	91	93	94	96	98	101	104	107	110	114	119	124	130	136				
	90	83	84	85	86	87	88	90	91	93	95	96	98	100	102	106	109	113	117	122		
	85	78	79	80	81	82	83	84	85	86	87	88	89	90	91	93	95	97	99	102	105	108
	80	73	74	75	76	77	77	78	79	79	80	81	81	82	83	85	86	86	87	88	89	91

Dew Point (in F)

		60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
Air Temp (in F)	104	110	110	110	110	110	110	111	112	113	114	115	116	117	118	119	121	122	124	125	127	128	130	132	133	136	137
	102	108	108	108	108	108	108	109	110	110	111	112	113	114	116	117	118	119	121	122	124	126	127	129	131	133	136
	100	106	106	106	106	106	106	107	108	109	110	111	112	113	114	115	117	118	119	121	123	124	126	128	129	132	
	98	103	103	103	103	103	104	105	105	106	107	108	109	110	111	113	114	115	117	118	120	121	123	125	127	129	
	96	101	101	101	101	101	101	101	102	103	104	105	106	107	108	109	110	111	112	114	115	117	118	120	122	124	127
	94	98	98	98	98	98	98	99	100	100	101	102	103	104	105	106	107	108	109	111	112	114	115	117	119	122	124
	92	96	96	96	96	96	96	97	97	98	99	99	100	101	102	103	104	105	106	108	109	110	112	114	116	119	121
	90	94	94	94	94	94	94	95	95	96	97	98	98	99	100	101	102	103	105	106	107	109	110	113	116	117	
	88	88	88	88	89	89	90	90	90	91	92	93	94	95	96	97	98	99	100	101	103	104	106	108	110	112	114
	86	86	86	87	87	87	88	88	89	89	90	91	91	92	93	94	95	96	97	98	100	101	102	104	106	108	110
84	84	84	85	85	85	86	86	87	87	88	88	89	90	90	91	92	93	94	95	96	97	98	100	101	103	-	
82	82	83	83	83	83	84	84	85	85	86	86	87	87	88	88	89	89	90	91	92	93	94	95	-	-	-	
80	80	81	81	81	82	82	82	82	83	83	83	83	84	84	85	85	85	86	86	87	87	-	-	-	-	-	

Appendix C: Local NOAA All Hazards Radio Coverage



Operated by the NWS Quad Cities:

Burlington - WXN83 162.525
Iowa: Des Moines, Henry, Lee, Louisa. Illinois: Hancock, Henderson, Mercer, Warren.

Cedar Rapids - WXL61 162.475
Iowa: Benton, Cedar, Delaware, Iowa, Johnson, Jones, Keokuk, Linn, Tama, Washington.

Dubuque - WXL64 162.400
Iowa: Clayton, Delaware, Dubuque, Jackson, Jones. Illinois: Carroll, Jo Daviess. Wisconsin: Grant, Lafayette.

Fairfield - WXN85 162.400
Iowa: Davis, Henry, Jefferson, Keokuk, Lee, Van Buren, Wapello, Washington.

Freeport - KZZ56 162.450
Illinois: Carroll, Jo Daviess, Ogle, Stephenson, Winnebago. Wisconsin: Green, Lafayette.

Macomb - WXJ92 162.500
Illinois: Adams, Brown, Cass, Fulton, Hancock, Henderson, Knox, Mason, McDonough, Schuyler, Warren.

Maquoketa - KZZ83 162.425
Iowa: Jackson, Dubuque, Jones, Clinton, Cedar, Delaware. Illinois: Carroll, Jo Daviess.

Medill - WXL99 162.450
Missouri: Clark, Knox, Lewis, Scotland. Iowa: Lee, Van Buren. Illinois: Adams, Hancock.

Princeton - WXL22 162.425
Illinois: Bureau, Henry, LaSalle, Lee, Marshall, Putnam, Stark, Whiteside.

Quad Cities - WXJ73 162.550
Iowa: Clinton, Cedar, Louisa, Muscatine, Scott. Illinois: Henry, Mercer, Rock Island, Whiteside.

Operated by Neighboring Offices:

Dixon - KZZ56 162.525
Illinois: Carroll, Lee, Ogle, Whiteside.

Galesburg - KZZ66 162.400
Illinois: Knox, Warren.

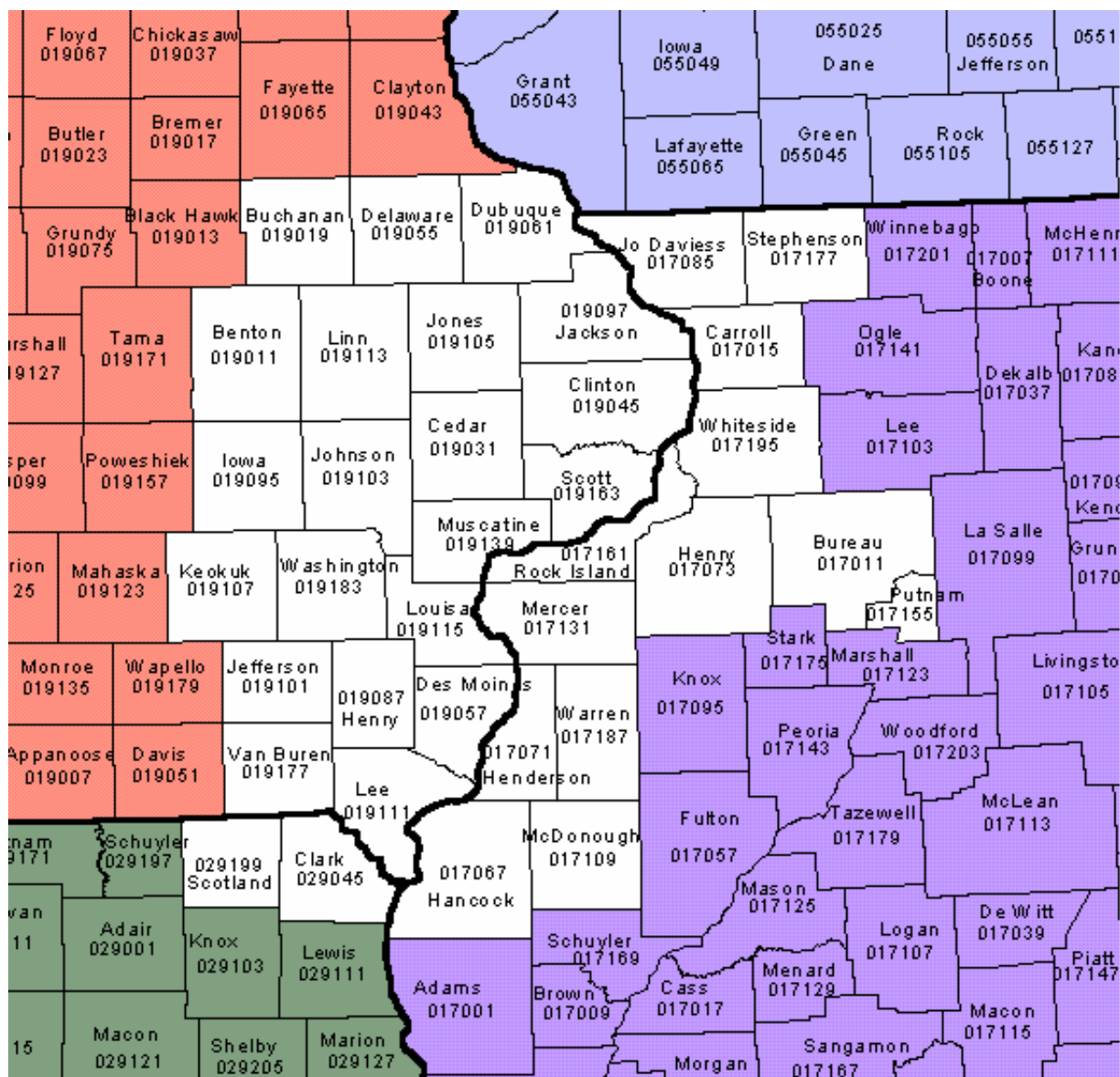
Lancaster - WXM36 162.550
Iowa: Davis, Appanoose. Missouri: Adair, Knox, Putnam, Schuyler, Scotland, Sullivan.

Montezuma - KXI62 162.450
Iowa: Iowa, Jasper, Keokuk, Mahaska, Marion, Poweshiek, Tama.

Peoria - WXJ71 162.475
Illinois: Fulton, Knox, Marshall, Mason, Peoria, Putnam, Stark, Tazewell, Woodford.

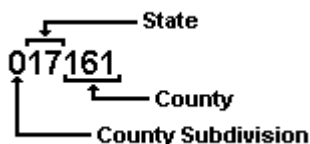
Waterloo - WXL94 162.550
Iowa: Black Hawk, Bremer, Buchanan, Butler, Chickasaw, Fayette, Floyd, Grundy.

Appendix D: Area County FIPS Codes



About FIPS Codes

FIPS codes establish a standard code identifier for each county in the United States. The full identifier for each county is a 6-digit number; the first digit for the county subdivision (this number should be set to 0; numbers 1 through 9 are NOT yet being used); the next two digits are the FIPS identifier for the state (Illinois is 17, Iowa is 19, Missouri is 29), and the last three digits are for individual counties. So for example, the full 6-digit FIPS code for Rock Island County, shown here, is 017161.



FIPS Codes for Other Counties

If you need FIPS codes for other counties, visit the [NOAA Weather Radio web site](http://www.nws.noaa.gov/nwr/indexnw.htm) (<http://www.nws.noaa.gov/nwr/indexnw.htm>) or call 1-888-NWR-SAME.

Appendix E: School Weather Preparedness Checklist

1. Location of NOAA All Hazards Radio or other warning source:

2. Person(s) responsible for and method of notifying:

- teachers/student body: _____
- temporary buildings: _____
- special needs students: _____

3. PA system backup:

4. High Wind/Tornado Safe-zones (in order of preference):

5. People responsible for main electricity shut off: _____

6. People responsible for gas shut off: _____

Appendix F: Effective Severe Weather Plan Worksheet

Threats:

Tornado

Extreme Wind greater than _____ mph

Time needed to get everyone to shelter: _____

Who will monitor the weather?

Designated Weather Watcher: _____

Criteria for initiating the plan:

Consider time needed, neighboring counties, warnings, severe weather sightings

Warnings: _____

Reports: _____

Other: _____

Logistics of initiating the plan:

Who will initiate action: _____

How will action be initiated: _____

Shelter Areas:

Safe-rooms are best; Otherwise small-span, interior rooms, minimize windows, maximize walls, protect from debris

Designated shelter areas: _____

Giving the “all-clear”:

When: _____

How: _____

Practicing the plan:

Evaluate time needed, suitability of shelters; Consider different shifts.

When: _____